UNITED STATES DEPARTMENT OF AGRICULTURE
Radio Service
OFFICE OF INFORMATION

OUTDOORS WITH THE SCIENTIST Tuesday, October 2, or later

NOT FOR PUBLICATION

READING TIME: 10 minutes.

ANNOUNCEMENT: Today we begin a weekly series of excursions into the great out-of-doors with the scientists of the United States Department of Agriculture. A chat with the Weather Man and a tour through his maze of instruments and charts, indoors and outdoors too, begins the schedule of Tuesday trips for nature lovers.

--ooOoo--

"Are you just going to take this thing up where you left off last year--?"

It was the Weather Man speaking and I was listening. Every now and then I would put in a question or two.

"Well, we believe that people are interested in the weather and that they like to hear talks about it," said I.

The Weather Man smiled. "I have been studying weather--- and people--- for a long time," he said, "and I don't know of anything that furnishes more people with a subject for brief conversation."

It was my turn to smile. I grinned. "How about the Younger Generation for a subject for conversation?" I asked.

"You must remember," he said, "that the weather never grows up."

I laughed right our loud. "We were speaking about rain," I said. "Suppose you tell me a little bit about rain. I know of nothing that has spoiled more picnics."

"Nor watered more crops," said the Weather Man. "Take the Big Rain of August 11 and 12 here in Washington. Suppose I tell you a bit about that."

"Do," said I. "It broke all the records, didn't it?"

Just then a rugged man with sandy hair came into the Weather Man's office. "Mr. Mosby," said the Weather Man, "this gentleman wants to know something about our big rain of last August." Mr. Mosby brightened up. "Mr. Mosby, the Weather Man said to me, "knows how to measure rain. He is one of our Weather Bureau men and he specializes in rain and rain measurements."

"Come with me," said Mr. Mosby.

Well, we went up a flight of stairs and entered a large sunny office. It was full of desks and tables and charts and instruments. I could hear a queer ticking coming from a shining brass instrument on the table. Mr. Mosby led me to a door, open, and we walked through, up a flight of steps and came out suddenly into the sunshine. We were on the roof. The great green squares of Washington were spread out below us. It was a dramatic moment, as the moving-picture writers say.

Things were moving pretty fast. The Weather Man had begun by asking me a question and here another Weather Man and I were up on the roof of the Weather Bureau in Washington--- all within five minutes.

We took a turn around an air shaft. Mr. Mosby pointed to what looked like an aluminum funnel fitted into a bucket standing on four legs. "This is the TIPPING BUCKET RAIN GAUGE," he said. "This instrument is used at all of our 200 weather stations to measure rainfall. It was developed by Professor Marvin of the Weather Bureau and is efficient and accurate." Mr. Mosby opened the instrument up and I saw two little buckets nicely balanced on a rod arranged like a see-saw. "The rain comes down through the funnel--- fills one of these little buckets--- and when one-hundredth of an inch of rainfall drops into the bucket, it is registered and the bucket automatically empties itself. Then the other bucket fills up. As the buckets fill and empty, the process is recorded on a revolving cylinder down in my office," said Mr. Mosby.

Then we took a look at the instruments used to measure snowfall and sleet--- those to measure sunshine and wind--- and went back to Mr. Mosby's office. He took me to one of the instruments on a table. Tiny pens were drawing straight, dotted, and jagged lines on a record sheet fastened to a revolving cylinder. I could hear the ticking of a clock which revolved the cylinder. "This instrument," said my guide, "is the office end of the instruments you saw on the roof. With this, we can measure wind direction and force, sunshine, and rainfall."

I looked at the small machine with new respect. I remembered the Big Rain of last August, in Washington, and decided to ask Weather Man Mosby about it.

"Have you the records of last August's rain?" I asked.

He showed me a record card, divided into little squares with pale brown ink lines. Jagged lines in lavendar ink seemed to tell some story or other. My friend pointed to the lines with his sharp pencil. "There's your storm," he said. "The storm that swept over Washington and the Chesapeake Bay region on August 11 and 12 was the greatest since the Weather Bureau began to keep records," he said. Seven and one-third inches of rain fell in 24 hours. Way back in 1878, five and four-fifths inches of rain fell in 24 hours.

"How about the rainfall record for the whole month of August?" I asked.

"Almost 14 and one-half inches for the month, in Washington," Mr. Mosby said. "It broke all records not only for August but all other months. Back in 1906, 14 and 36-one-hundredths inches of rain fell in the month of August, though

"What's the average rainfall during August for this part of the country?" I asked.

"Four and one-one-hundredth inches," he told me.

I bade Mr. Mosby good day and told him I wanted to talk with him about rain some day soon. Then we went to see another Weather Man in the Weather Bureau, Dr. Day, who knows about many things interesting to people.

"Dr. Day," I said, "I have just heard many interesting things about rainfalls. I have heard that more than 14 inches of rain fell on Washington during the month of August. Can you tell me how much an inch of rain is?"

"One inch of rainfall per acre would mean that more than 27 thousand gallons of water would fall on that acre. That would be 113 tons. If a farmer had to haul only one inch of rainfall to an acre of crops, he'd have to put on 113 loads of one ton each."

I was surprised and showed it. "That ought to last the crops a long time seems to me," I said.

Dr. Day smiled. "From 10 to 15 inches of rain a year are needed even for dry-farm crops," he said.

I sat down and began to figure things out in my head. Say a dry farmer had 160 acres of crops, I thought. Now say he needs 10 inches of rain per acre per year to get a crop. That would mean that he would have to haul more than 180 thousand tons of water to his farm to get a crop--- if no rain fell. I began to have more respect for the value of rain.

"What is the dryest spot in the United States--- meteorologically speaking?" I asked.

"They get only about 2 inches of rain in one spot in southeastern California," said Dr. Day. "But you can't raise crops on that. Some parts of our country get from 40 to 60 inches of rain a year. The annual rainfall in Washington, D. C. is about 44 inches."

Dr. Day began to sum things up. "The farmer may think he has a hard time cultivating and harvesting his crops," he said. "But if nature should refuse to lend him a hand for a single season, he would go to the poorhouse with all his

family. Nothing will quite take the place of rainfall, but some parts of the world get a lot more than others. Damage may result from too much rain, just as it does from too little. Heavy rains wash away the soil and there's a constant loss of soil fertility because of rain. Millions of acres of fertile soil are carried to the sea every year by rivers which are fed by rains. Take the famous Yellow River of China--- sometimes called the Yellow Peril or the River of Sorrow. This river has had such vast floods in the past that as many as 50 thousand people have been killed by one tremendous fall of rain. Rain doesn't always come down as lightly as the poets like to say, but it won't take much deep or painful thought to understand that the advantages far outweigh the disadvantages. If rain washes away some of our choicest soil, it breaks down rocks to make a new supply. If rain washes some of the farmer's fertilizer away, it is always bringing more of that valuable substance down from the air. Every thunderstorm brings a fresh supply of ozone to purify the air we breathe. Though rain may cause the noxious and poisonous weeds to grow, it likewise nourishes the bounteous harvests that feed us. There's a reason why rain has been called the oil of gladness which lubricates the mental and physical machinery of the farmer and so makes us all happier and more prosperous."

Dr. Day paused a moment and smiled. "And then just look what the rain means to poets," he said. He began to quote a few lines softly. Here are the lines:

"'Tis like the birthday of the world
When earth was born in bloom.
The light is made of many dyes,
The air is all perfume.
There are crimson buds, and white and blue,
The very rainbow showers
Have turned to blossom
Where they fell, and sown the earth with flowers."

"Of course, those lines were written for spring, but what would spring be without April showers?" he said.

"As I remember April--- not very much," I said as I took my leave.

--ooOoo--

ANNOUNCEMENT: Next Tuesday we go into the National Forests with one of Uncle Sam's Foresters. On succeeding Outdoor days we'll travel and talk with scientists who know insects and wild animals and birds. The Weather Man will join us on the first Tuesday of each month.

UNITED STATES DEPARTMENT OF AGRICULTURE
Radio Service
OFFICE OF INFORMATION

OUTDOORS WITH THE SCIENTISTS Tuesday, October 9, 1928.

READING TIME: 10 minutes

ANNOUNCEMENT: Won't you come for a walk in the woods with Jack Pine the Veteran Guide, folks? It'll only take 10 minutes. And Jack's an interesting guide. He's consented to talk to you about forest fires and how not to have them in this week's OUTDOORS WITH THE SCIENTIST radio chat from the United States Department of Agriculture. Jack Pine's a practical scientist in forest fire prevention, and he's all ready to set out with us.---Let's go!

--ooOoo--

What's that you were saying about forest fires? I can't hear as well as I used to. And out here in God's great out-of-doors, there's plenty of room for your voice to go wandering away among the trees.

Wait! Let's get going and talk later. There's plenty of time. Let's look at the trees first.

Let's take our time. We don't get this every day. Dark and cool here in this stretch of white pines. Feel those soft winds? Listen to those pines whisper in the breeze. Take a long breath. Get that smell of resin--- Um-m-m! Great, eh? Good for the lungs. These trees are 300 years old. We won't have many more forests as old as this one. We use wood too fast.

Ah--- the lake! A beauty, isn't it? The water's the color of amber. That's because of the bits of wood that have been sinking into it for ages. See that widening circle out there in the water. A big bass jumped after a fly. Wish we had time to drop him a line.

Sh-h-h-h! See that? Over on the far bank. A brown bear. Back's turned and he doesn't see us. Busy digging up grubs. Woof! Hi! There he goes. Look at him scramble through the brush....

Those big pines with their black trunks make a wonderful frame for our picture, don't they? You're going to remember this a long time. Don't miss anything. Me--- I stay here. In these cool green woods.

Getting hungry, are you? Won't be long now. We're going to stop and eat round that bend ahead--- in that grove of pines coming down to the lake shore. In that grove there's a little green cabin. That's where the Ranger lives. He's lucky. But we'll stop outside under the trees.

Here we are. Now we're going to put on the nose bag. Chow! Ah-h-h-h! Empty the duffle bags. That's right. It's all here. Frying pan, coffee pot tin plates, tin cups, tin knives and forks and spoons. Cut some bacon. I'll

start a fire. Get some water in that bucket. Make some coffee. Hi--- not so much! Too strong. Make your hair curl. Six spoonsful, that's about right. Put her right on those live coals. Fine. How many pieces of bacon can you eat? Ten? O.K. Gorge yourself.

Smell that coffee! And that bacon! You're not going to be sorry you had all this.

Here it is. Come and get it.

Look at those trees! We don't want to lose those, do we? But one careless camper or traveler can do a lot of harm. Sometimes I think it would save a lot of trouble and worry if the woods were made out of asbestos. You see a nice, pretty stand of young timber--- cool and green--- and growing fast enough to make sawtimber within one's own lifetime. Then some careless smoker or camper comes along and throws a burning cigarette stub into the brush. Poof! And we have to start all over again.

You'd think that anyone with good horse sense would know that a lighted match or burning cigarette could start a fire in the woods. But there are a lot of folks who don't. Between 5 and 6 thousand forest fires a year in this country are caused by careless smokers. That's what the Forest Service records show.

We've got to be careful. A lot of folks need reminding that fire will start fire. It's not hard to scrape a little hole with your heel when you want to throw away a butt or knock the ashes out of your pipe. Then stamp the fire out in the damp earth. Don't throw cigar or cigarette stubs, or pipe ashes, into dry grass or brush. Please don't!

Some folks like to drive in the woods with their autos. Me--- I like to walk, with a pack horse along. I like to go slow--- get close to things. But if you drive a car, put a simple little ash receiver on it. Don't knock the ashes off along the side of the road. It might set us back 30 years or more, as far as the forests go.

And watch your matches. Don't throw 'em away when they're still smouldering or burning. Sometimes you think they've gone out--- but maybe they haven't. Watch the old-timers. They break every match in two before they toss it away. It's pretty sure to be out by then. Anyhow, there's no rush to throw a match away. There's plenty of time. Look how much time it takes to get a growth like this!

Before we go, I'm going to show you how to put out a campfire. Lots of campers don't know how to do that. But the trees know what it means when a fire's left burning. You can't tell what a campfire will do when it's left alone. Campfires sometimes do funny things when there's nobody around to watch them. A wind might come up--- just a little breeze, and away she'll go. Don't build your fire against a tree or a log, or close to dry brush or grass.

Have you ever seen a stretch of woods that has been burned over? A few tall trees left--- still green. That makes some people wonder if forest fires do so much harm after all. Sometimes folks burn their woods over as a regular thing. They say it "greens up the grass". But look how it blackens up the young trees--- and scars and hurts the old ones! Those people who burn over their woods don't look very far ahead, seems to me. Just try and find a vigorous young tree in a burned over patch! Fire gets in its deadliest work on the young trees. On the little trees that would make good sound timber in the years to come. It takes only a little fire to scorch and kill the little fellows that are just getting a start in life. Give 'em a chance.

Maybe it isn't hard to put out a small fire in the woods--- but it'll take a hard-working army to put out a big one. Listen. If you ever run onto a small fire in the woods, just stamp or beat it out. That'll be your daily good turn, and a big one. If there's any water around, throw it on the fire. If you have a shovel or rake handy, you can use that to clear a trail around the fire to keep it from spreading. If the fire's a big one--- too big for you to handle-- send quick word to the nearest fire warden or forest ranger. He won't waste any time. He knows what forest fires mean.

It's just a matter of common sense. There were about 90 thousand different forest fires in this country last year--- and nearly 90 per cent of them were set by man. But a little common sense would have prevented nearly all of them. Don't you be one of the careless ones. You be one of the wise ones. You don't want to have to tell it to the judge and say--- "Judge, I didn't think the woods would burn so easily. Anyhow, I thought I put my fire out." The wise old judge has heard all that before. He knows that prevention is 90 per cent of our forest fire battle.

I can't eat any more, can you? Did any food ever taste so good before? Umh. Umh.

I'll souse these dishes. Take it easy for a minute. Think. Think how beautiful these old woods are. There are lots like 'em in this land of ours. I'm just an old guide. I haven't seen 'em all. But I love 'em. The woods are my church and Bible. I don't want anything to happen to 'em. Be careful with fire, pal! Will you do that for me? I love these woods--- I guess we all do. Fire kills 'em.

Ready to go? First, let's put this campfire out. It only takes a minute or two. Watch me. I'm going to save some trees. Soak it with water. Stir up the coals while you pour the water on. Turn the small sticks over and soak 'em all. Wet the ground around the fire. If you can't get water, stir in the earth and stamp it down till it's packed tight over and around the fire. Be sure the last spark is dead.

Well, I guess she's out all right. She's done us a good turn and now we'll let her sleep. That's fair enough, isn't it. We won't need that fire any more and the next fellow that comes along couldn't use it. Better put it

all out. Let the pines whisper over the spot. Safe and sound.

Ready to go, pal? I hate to leave this place but I guess we can't stay here forever. Let's go! And come back soon.

--ooOoo--

ANNOUNCEMENT: Some time we'll have Jack Pine talk to you again. And take you for another trip in the woods. Jack will bear close acquaintance. A regular fellow, Jack. But now we must close for today. But there'll be another trip OUTDOORS WITH THE SCIENTIST next Tuesday. Watch for it.

UNITED STATES DEPARTMENT OF AGRICULTURE
Radio Service
OFFICE OF INFORMATION

OUTDOORS WITH THE SCIENTIST. RELEASE: Tuesday, October 16.

NOT FOR PUBLICATION

READING TIME: 10 minutes.

ANNOUNCEMENT: Here's the story of the great 200-million-dollar hurricane that swept over the West Indies and up along the southeast coast of the Atlantic last month. And the story of how the U. S. Weather Bureau followed that storm, got the jump on it with warnings by telegram, thus saving great loss in lives and property. Today's Weather Chat comes as this week's OUTDOORS WITH THE SCIENTIST radio feature, prepared by the U. S. Department of Agriculture for broadcast by Station_____.

---ooOoo---

All night--- the night before I went to talk with the Weather Man about hurricanes--- a drizzling rain fell and the wind whistled and the curtains rustled like ghosts at the windows. Awaking out of restless sleep, I would hear the rain on the roofs. It was very dark. The voice of the wind wasn't very sympathetic company that night.

In the morning it was cold and grey, but the streets glistened with rain. People were wearing slickers and galoshes. They kept the morning paper under their coats so it wouldn't get wet.

I bought a paper and glanced at the headlines. GALE DUE HERE BY NOON, one read in large black letters. And another, HURRICANE SWEEPING TO NORFOLK; CAPITAL AWAITS 45-MILE GALE.

Reading on down into the news stories, I learned that this destructive and dangerous storm--- a typical West Indies hurricane--- of September 11 to 20, had cut a path 1,000 miles long, taking toll of more than 1,000 lives in Porto Rico and Florida and doing 200 million dollars property damage in Porto Rico, Florida, Georgia, the Carolinas, and Virginia.

The cold, the wind, and the rain of the night before was the tail-end of that same storm that had swept up from the Cape Verde islands, off the west coast of Africa; roared over islands of the West Indies, destroying lives and homes and hopes; screamed up and up overthe Caribbean sea and northward over Florida and parts of the east Atlantic coast-line. Believe me, I was glad that it was only the tail we had felt because that storm crossed the Atlantic with the speed of an ocean liner and when it hit land--- Zowee! Of course you folks have read a lot about it in the papers so it isn't necessary to

tell you that the wind reached a speed of 150 miles an hour at times.

But when I reached the Weather Bureau office, I learned a lot of news things about this particular hurricane and about hurricanes in general. Mr. C. L. Mitchell, one of the forecasters in the Weather Bureau, was in and would talk to me. He told me that the weather men had been watching this storm for more than a week and had predicted where it would hit and when. It seems that hurricanes can't have any privacy any more--- the Weather Bureau watches them like a cat--- and I guess it's a good thing. But let Mr. Mitchell talk about it.

I led off with this question--- "Did the Weather Bureau know that this great storm was coming and what did the Weather Bureau do about it?"

Mr. Mitchell handed me copies of storm warnings that had been issued. I glanced at them and they were very definite. You'll hear them read to you later.

"These destructive tropical hurricanes don't reach the West Indies and the Gulf Coast of the United States without warning," he said. "The storm which has just swept across the Florida peninsula has been under the watchful eyes of the Weather Bureau forecasters since Monday, September 10. On the morning of that day, signs of an unusual storm to the southeast were received by radio from two vessels in the Atlantic, fully 600 miles east of the farthest outpost in the Lesser Antilles islands from which weather observations are regularly sent. As the hurricane traveled onward, more definite information became available from the various island stations in the Bahamas and West Indies which report regularly to the Weather Bureau in Washington--- as well as radio reports from ships in the Caribbean Sea and the Atlantic Ocean."

"you had the jump on the storm, then, Mr. Mitchell," I said.

"In a way, yes," he said. "That is, we knew it was coming some time before it hit us. At first, we issued advisory warnings and storm signals twice a day--- later on, oftener. Like many other tropical hurricanes, this particular hurricane probably originated near the Cape Verde Islands and had already traveled two-thirds ofthe way across the Atlantic when it was first reported. For several days, all indications showed it to be moving west or northwestward without great change of direction, but there wasn't any certainty that it would not, like most similar storms, recurve and move out northeastward into the Atlantic rather than strike the Florida coast. Nevertheless, we sent out notices and warnings, urging vessels at sea to proceed with greatest caution and advising all interests likely to be affected to prepare to take such protective measures as possible."

Well, it seems that this hurricane did not curve out to sea again. It hit Porto Rico and other parts of the West Indies with terrific force--- destroying property--- destroying lives--- destroying food crops. The story of the Weather Bureau warnings reads like an adventurous novel and here are some of the highlights as told by Mr. Mitchell himself.

"Followingthe first radio report of a disturbance on Monday morning, September 10, came an evening report from another vessel 500 miles east of Bridgetown, Barbadoes, giving more definite information that a tropical cyclone was centered somewhere in its vicinity. On the morning of the eleventh, two more ships reported, fixing with still more accuracy the location of the center of the storm and its direction. At 10.21 a.m., September 11, the Weather Bureau sent this warning telegram to all stations along the Atlantic Coast from Boston, southward, including the Gulf Coast west to Galveston and to the Bahamas and West Indies generally---

> "A tropical disturbance was centered at 8 p.m. Monday, about latitude 15 degrees north, longitude 50 degrees west (nearly 600 miles east of Barbadoes) and moving west or west northwestward."

"On the morning of September 12, the Weather Bureau advices indicated that the hurricane center was near the Island of Dominica in the Lesser Antilles, and that it was moving west or west northwestward at the rate of about 450 miles a day, attended by winds of hurricane force--- possibly 100 miles an hour or more--- near its center.

> "Its center will pass some distance south of Porto Rico," the warning telegrams read, "probably south of Haiti. Great caution advised vessels in Eastern Caribbean Sea especially north of latitude 15 degrees for the next 36 hours."

"The hurricane didn't stop nor curve out to sea. It kept on coming and the Weather Bureau kept a watchful eye on its behaviour. By the morning of September 13, the disturbance was very definitely called a hurricane in all the telegrams. Its centerwas then a short distance south of the Virgin Islands. The Message read---

> "This is a dangerous storm. Great caution advised vessels near its path."

"All messages," said Mr. Mitchell, "carried the approximate latitude and longitude of the storm center and all available information as to its direction."

The great storm swept on through the islands of the West Indies, doing huge damage. By this time it was felt that it might hit Florida but, as most hurricanes recurve to the northeast without touching the Florida coast, hurricane warnings are not actually displayed there until it seems quite certain that winds of hurricane force will actually be experienced. This storm, however, didn't recurve, but tore directly northwestward across Florida. The following emphatic warnings was issued at 10:00 a.m. on Sunday, September 16---

> "Hoist hurricane warnings 10:30 a.m. Miami to Daytona, Flordia. Northeast storm warnings displayed north of Daytona to Savannah and northwest storm warnings south of Miami to Key West to Punta Forda. No report this morning from Nassau. Indications are that

Hurricane center will reach the Florida coast near Jupiter early tonight. Emergency. Advise all interests. This hurricane is of wide extent and great severity. Every precaution should be taken against destructive winds and high tides on Florida east coast especially West Palm Beach to Daytona."

Other warnings, just as definite, were issued throughout Sunday and later. The storm hit Florida--- blew northward--- and finally died out, but not until it had done terrific damage to life and property. Had it not been for the Weather Bureau warnings, issued regularly all the time the storm was on and before it actually struck, the damage would have been much heavier, both in property and lives.

Mr. Mitchell explained to me that tropical storms, starting out as intensified disturbances with low barometer pressures at their center, sweep wildly along over the sea, holding form so long as they remain over water. As soon as they strike land, however, they immediately begin to spread out and dissipate, the high winds diminishing but rain continuing and the main dangers being transferred from cyclone destruction to damage by floods. Since this particular storm was discovered, it has traveled nearly 2,000 miles in 8 days, the Weather Man said, doing great damage to parts of the Virgin Islands, the Bahamas, Porto Rico, Florida, Georgia, and South Carolina. A hurricane a lot like this one swept over the West Indies in 1900, striking the Texas coast and destroying Galveston.

But, luckily, these storms no longer get by without warning. The Weather Bureau, equipped with careful instruments for measuring the elements, studies the comings and goings of the great, blustering winds as well as of a gentle rain. And warnings issued as the hurricanes come on, help people to protect their property and save their lives from the fury of the winds and the floods.

---ooOoo---

ANNOUNCEMENT: Another OUTDOORS WITH THE SCIENTIST radio chat will be sent by Uncle Sam's Department of Agriculture through Station_____ next Tuesday.

UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

OFFICE OF INFORMATION

OUTDOORS WITH THE SCIENTIST. Tuesday, October 23,1928

NOT FOR PUBLICATION

READING TIME : 10 1/2 minutes.

ANNOUNCEMENT: We bring to you today the story of old Three Toes, the wolf, and other Stock Killers that are adding their share to the $25,000,000 loss that stockmen suffer every year at their fangs. Three Toes was a killer, but he was only one of many. Today's talk, this week's feature in the U. S. Department of Agriculture's OUTDOORS WITH THE SCIENTIST radio chat broadcast by Station_____, deals with control measures.

---ooOoo---

When it's moonlight in the Black Hills--- and the stars are high--- and the wind croons through the black pines--- it seems that you can hear that wild, ghostly WHOOO--OO---OOOO riding down on the night wind. It's the call of old Three Toes, the wolf. Three Toes the Killer. Three Toes is dead now. He came to a bad end in July, 1925, trapped in the hated white man's trap--- after he had so cunningly avoided such machines for so many year! And dead wolves tell no tales. But while Three Toes lived and prowled during the night over his range, this veteran Killer put fear into the heart of every rancher along his beat. And his ghost still lives in the Black Hills--- and his memory. And the old-timers still like to talk about him over the camp-fire on the range--- or over the pine table in the ranch mess hall. For gaunt Three Toes was the most famous four-legged killer in Harding County, South Dakota. And if you don't believe it, here's part of his record----

In May and June, 1925, Three Toes killed sheep valued at $2,000. On 2 nights in that spring, he killed 64 sheep on a single ranch. He killed $4,000 worth of sheep in the year 1925. The Biological Survey of the United States Department of Agriculture estimates that Three Toes cost sheep-men of that section of the country $50,000 before he was finally caught in a trap. More than 150 men hunted him at one time or another. A $500 reward was offered for Three Toes dead or alive.

Three Toes seldom killed for food alone. He loved to kill. He loved the smell of blood and he loved to drag down his prey. In one single killing he brought down 34 rams. On another night he killed 17 head of fine sheep. On still another night, he killed 28 head. All of these kills were of registered animals. An expert estimates that these 3 kills alone meant a loss of $3,000.

Old Three Toes isn't the only Stock Killer of note that we could mention. We might tell the story of other famous wolves--- of the Custer Wolf, the Split Rock Wolf, and the Butchering Wolf, and many others.

Back in 1916, there was a terrible outbreak of rabies among coyotes and bobcats in California, Idaho, Nevada, Oregon, Washington, and Utah. This outbreak caused heavy loss to livestock. And, in addition, more than 2,000 persons were bitten by rabid animals and at least 63 of them died. So serious did this outbreak become that in some sections of the infested area children going to school had to be accompanied by mounted guards to protect them from being bitten by rabid animals. That's another menace of destructive Stock Killers, such as wolves, coyotes, lynxes, bobcats, predatory bears, and so on.

Well, most of the destructive wolves have followed the trail of old Three Toes and are now in some Stock Killers' particular under-world. But there are still many wolves and several million coyotes and bobcats preying on the stock of ranchers and farmers in the United States. As a matter of fact, the Biological Survey, as we have said, estimates the annual loss to livestock men by these predatory animals at some $25,000,000. Let's illustrate.

The following typical cases of livestock losses show the destructiveness of Stock Killers that are still very much alive and kicking. In Colorado, a single wolf took a toll of nearly $3,000 worth of cattle in one year.... In Texas, 2 wolves killed 72 sheep, valued at $9.00 each, in 2 weeks.... One wolf in New Mexico killed 25 head of cattle in 2 months. Another in the same State killed 150 cattle, valued at not less than $5,000 during 6 months previous to his capture by a Biological Survey hunter.... In Wyoming, 2 male wolves were killed, which, during one month had killed 150 sheep and seven colts.... The county agent at Coalville, Utah, reported that wolves had taken 20 per cent of the year's calf crop in that section... A wolf taken in New Mexico was known to have killed, during the preceding 5 months, 20 yearling steers, 9 calves, one cow, 15 sheep, and a valuable sheep dog... In Oregon, 4 coyotes in 2 nights killed 15 purebred rams valued at $20 each.... One flock of sheep in Morgan county, Utah, was attacked by 3 coyotes and $500 worth of sheep were killed in one hour.... One bobcat in Texas killed over $300 worth of Angora goats. Another cat in the same State killed on a single ranch 53 rams, one ewe, and one goat in one month....

Survey men estimate that each wolf kills about $1,000 worth of livestock a year--- each mountain lion kills an equal value of livestock---- each coyote and bobcat kills about $50 worth of stock---- and each stock-killing bear kills stock valued at $500 each year. Multiply those figures, if you can, by the total number of stock killing wolves, mountain lions, coyotes, bobcats, and bears, and you'll have an idea of the importance of ridding the range of these destructive enemies of ranchers and stock-men. If mere figures leave the stock-men unmoved and uninterested, he won't be unmoved when he goes out to the corral in the morning and finds one of his most valuable steers pulled down by a wolf--- one of his promising colts killed by a mountain lion--- or the scattered carcasses of his sheep killed by coyotes for the sheer lust of killing.

Well, for a long time this thing went on. This killing went on almost unchecked. Now and again a rancher would see red when he came across some of his best stock lying in their own red blood--- get out his rifle--- fill his belt with shells--- and go on the trail of the Stock Killer. Or he would arm the neighbors and the boys would go on the warpath. This was fine, but the

Stock Killers, finding it easier to kill domestic livestock than wild buffalo, elk, and deer, grew and prospered. They prospered until one rancher working alone no longer could control them. So the Biological Survey stepped in to help the stock-men.

Of course, the Survey had been making careful studies of the number and habits of Stock Killers in the United States for many years. But the first demonstrations and experiments for the control of wolves and coyotes were carried out in 1914-15 in Colorado, Nevada, Texas, Idaho, Oregon, and other Western States.

Destruction of livestock continued to be so serious--- and the means of protection then used afforded so little real relief to the stock-raising industry--- that in 1915 stockmen took up the matter with Congress. On July 1, 1915, Congress appropriated $125,000 to assist in organizing campaigns against predatory animals on national forests and other public lands and to work out the most efficient ways of controlling Stock Killers. Then the Biological Survey built up an organization for field work in predatory-animal control and the suppression of rabies in wild animals.

Skilled hunters were hired to give their full time to the work of hunting Stock Killers down. They were successful. The work is still going on.

Here's how the work of control was first carried on. Three methods of destroying predatory animals were followed--- shooting, trapping, and poisoning. During the first year, 424 wolves, 9 mountain lions, 11,890 coyotes, and 1,564 bobcats were accounted for. Demonstrations and experiments were carried on in localities other than on national forests and public lands, where predatory animals were causing heavy losses of livestock. In 1916, an emergency appropriation for the work, amounting to $75,000, was approved by Congress.

The work goes on. Last year, predatory-animal control operations were carried on in all the States from Montana to Texas and westward, and also in South Dakota, the Biological Survey says. Organized cooperative work was put under way before the close of the year in Oklahoma and Arkansas--- States in which wolves and coyotes are causing severe loss to wild game, domestic livestock and poultry. Coyote control was carried on to a limited extent also in southwestern Kansas and on the Niobrara Federal game reservation in Nebraska. As an illustration of the success of this work--- one wool-grower in western Colorado, who lost 60 lambs and 8 ewes during lambing operations one year ago, says that the Biological Survey control measures kept his loss down to one lamb this year. He also said that now he can turn his ewes and lambs on the range without fear that they will be slaughtered by Stock Killers.

The coyote is probably the most aggressive and troublesome of wild animals that prey on domestic livestock, but even losses from coyotes are being cut down greatly. More than 35 thousand coyotes were killed last year. That should be good news to Western stock-men.

So the voice of old Three Toes is getting fainter and fainter. Today he is a memory. If you had a Three Toes, a Custer Wolf, or just predatory coyotes or bobcats in your own territory, you too would get in touch with the Government Leader of predatory-animal control in your State or write to the Biological Survey of the United States Department of Agriculture, Washington, D.C.

---oo0oo--

ANNOUNCEMENT: That ends today's story of the Stock Killers. Each week, at this period, we bring to you a special feature of this kind as Uncle Sam's regular weekly OUTDOORS WITH THE SCIENTIST radio chat.

UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

OFFICE OF INFORMATION

OUTDOORS WITH THE SCIENTIST. Tuesday, October 30, 1928.

(NOT FOR PUBLICATION)

READING TIME: 10 minutes.

ANNOUNCEMENT: If you like nights out under the stars--- or the feel of a gun butt in the hollow of your shoulder--- or happy hours spent in the marshes, in the hills, or along the streams, you should like this talk on Wild Life Reservations. The chat comes as this week's OUTDOORS WITH THE SCIENTIST radio program, prepared by the United States Department of Agriculture for broadcast by Station_____.

---ooOoo---

It was that mysterious hour of night when the earth seems to pause and brood. You know, look back on itself and wonder. Our campfire was burning low. Only a few glowing coals left, and every once in a while, a little spurt of flame. Sheldon and I sat by the fire, saying nothing. We could hear, as a sort of undertone to everything, the steady song of the great falls down below. But in front of our camp, the river was lazy--- slow and lazy. The lapping of the little waves on the gravel beach was part of the song the night was humming softly. A fish jumped in the river. We noticed the circle widening out. The moon was that bright. The night breeze came up and began to do things to the pines. Sheldon got up and stretched his arms out, then above his head.

"I could sit here forever, Jim," he said. "And this is our last night. But we're getting out early in the morning--- before sunrise. Me--- I'm going to turn in."

We had made the bed on billowy, aromatic pine boughs. Then stretched the tent above it. That's the way to do it. That's the way the old-timers do it out there. Man! Soft as thistle down. In a minute, Sheldon and I were side by side. He gave a great sigh of content. A leaf fell and slid down the tent top. Sounded like a bear trying to break in. You know how that goes....

You don't go to sleep at once. You lie on the pine boughs and think a bit--- and talk.

"Millions of hunters" mused Sheldon, "---and the game's running out."

Sheldon is connected with the Biological Survey of the United States Department of Agriculture. He knows the game situation from beginning to end. We have hunted together more than once. I let him go. He got into the subject like a duck taking to the water.

"Wonder how many like us there are in the United States," I said. "You know--- hunters."

"I can give you an idea on that," Sheldon said. "There were more than 5 1/2 million licensed hunters in 1927. You could add at least another 1 1/2 million who hunt on private grounds--- and need no license--- and those who hunt illegally. That makes probably 7 million altogether."

I sighed. "So many hunters--- and the game so scarce," I said.

" And the hunter has the drop on his game, too, Jim. Modern firearms give the hunter a big advantage. Then the auto, better roads, quick transportation of many kinds, the airplane, make it possible for a hunter to reach his game in short order these days. And what's more, the steady march of civilization is encroaching on the game's hunting grounds. Draining marshes takes food from wild fowl. Big game is being driven deeper and deeper into the hills. Some kinds of game that used to be plentiful, are now almost unknown to the average hunter. Why I can remember when we could take a full bag of ducks in half an hour's shooting right in this neighborhood. And fish! The streams were full of 'em. You don't see many mountain sheep any more. Mountain sheep were fairly plentiful some years back. The buffalo have passed on...."

"That's a sad speech," I said. "What's the answer, Sheldon?"

"We in the Biological Survey say that it is to be found in WILD LIFE RESERVATIONS," Sheldon said. "The refuge idea as a means of conserving valuable game and other wild life isn't new. It has been tested and successfully used in several States as a means of protecting and re-stocking covers where wild life is threatened or has about disappeared. The steady increase of birds and animals on Federal reservations during the past year is still further proof of the soundness of the system. Game specialists say that the refuge system is the only means by which we can prevent extermination of many of the valuable forms of wild life in america."

" How many of these refuges are there in the United States, Sheldon?"

"About 125" Sheldon said, "including those in Alaska, Porto Rico, and Hawaii. More than two-thirds of them are administered by the Department of Agriculture. The others, which come under the Department of Commerce, Interior, War, and Navy, were established primarily for other purposes, but incidentally give protection to some forms of wild life. Only about 40 of these refuges, however, are frequented by waterfowl; most of them afford sanctuary to nonmigratory birds. More refuges, especially in the East, are badly needed for our wild ducks and geese right now."

Our tent flaps were open and we could look down the grassy hill to the moon-lit river. There were great blue-black pines all around the clearing. The fire was out now, but the moon was a kindly light that etched our little world in silver. The falls were thundering far away. We caught only the deep organ notes. A cricket chirped from some hidden nook.

Sheldon talked on, softly. "It's a good thing we have refuges," he said. "There's no use going hunting when there isn't anything to hunt. But I'm confident that we're going to have these trips of ours for a good many years yet. And our children---and their children, provided a sufficient number of refuges is established before it is too late.

"You see, Jim," he went on, "these national bird and game reservations really conserve game. They are scattered over many parts of America. The bird reservations, distributed irregularly from Florida to Alaska and in Porto Rico and Hawaii, protect the nesting places of millions of such birds as pelicans, gulls, terns, herons, and other fowl. The heron rookeries include some of the main breeding places in the United States of the beautiful egret and the dainty snowy heron. Before plume hunting was prohibited by Federal law, both of these birds were hunted almost to extinction, for their plumes.

The big-game reservations, administered by the Biological Survey in Montana, Wyoming, South Dakota, North Dakota, and Nebraska maintain herds of buffalo, elk, antelope, and deer. Take the National Bison Range in Montana. There's a buffalo herd on that reserve that numbers about 450 head. However, it is not big enough and the government is compelled to dispose of the animal increase for lack of grazing area. In addition, many species of big game still live on the national forests, and on some of those, game refuges have been created.

"Then there's the Winter Elk Refuge in Jackson Hole, Wyoming. I'll never forget a trip to Jackson Hole, Jim. It's part of that wonderland that includes the Yellowstone National Park. The Snake River winds in graceful curves through the valley hemmed in by mountains. On the western side is the great, towering Teton Range, and the elk --- The elk of the Yellowstone Park region and the adjacent national forests make up the only really large herds of these big game animals remaining in the United States. But these are mere left-overs of the great herds that used to roam the entire country."

"The few wild fowl refuges that we have are doing a lot to help preserve bird life in the United States," Sheldon went on. "Most of the wild ducks and geese breed in Canada and Alaska, for example, but more and more of them are nesting in the United States each year since the Federal law prohibiting spring shooting was passed. More refuges are vitally necessary to protect the birds that nest in both countries and winter in the United States. At present, the Biological Survey controls 26 refuges established primarily for waterfowl. As population increases, many more refuges will be needed---especially in regions where the birds congregate to rest, breed, and feed."

"Looks like money made available to maintain these Government reservations will pay real dividends in the future," I said.

"It certainly will," said Sheldon. "As long as Uncle Sam remains the friend of our big game and wild fowl, I am confident that he will see to it that this wild life will persist even if we do have 7 million hunters. These refuges not only conserve the supply of game--- they really add to the supply. Take the case of elk. Native elk went the way of the buffalo and became extinct in Arizona more than 30 years ago. Well, in 1913, 80 elk were put on the Sitgreaves National Forest in Arizona. They were brought from the Yellowstone region. There are now between 400 and 500 elk in the Sitgreaves National Forest. This range is beautifully suited for re-stocking with elk. Under proper administration, the elk there may be expected to spread gradually to neighboring sections and become a splendid addition to the game resources of the State and Nation. The same general fact holds good for all of the/odd reservations administered by the Government."

We had had an exciting day and were both tired. The song of the wind in the pine needles made a restful lullaby. Our voices grew softer and softer. The river was lapping on the shore.... The sleepy organ of the great falls played the soft low notes.... The tent flap swayed gently in the breeze.... We were falling asleep in spite of ourselves.

"Looks like this needn't be our <u>last</u> trip," I said.

"You like <u>this</u>, don't you?" said Sheldon.

"Right. And so do you."

"All the more reason why we've got to do our part to save the game," said Sheldon.

"Let's sleep on that," I said. And then we were in the land of dreams.

---ooOoo---

ANNOUNCEMENT: There are two bulletins published by the U. S. Department of Agriculture dealing with wild-life conservation, the subject you have just overheard the hunter friends discussing. They are Farmers' Bulletin 1575-F, called GAME LAWS FOR THE SEASON, 1928-29, and Farmers' Bulletin 1576-F called FUR LAWS. A request addressed to this Station will bring either or both publications to you.